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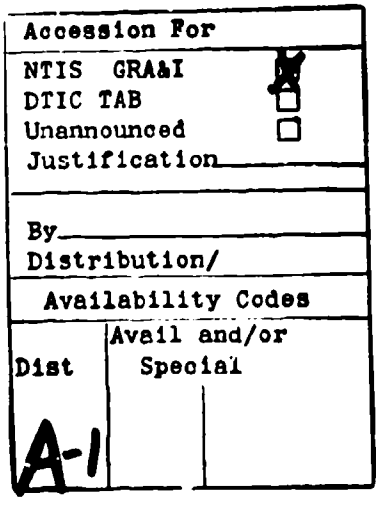

REPORT

of the

DEFENSE SCIENCE BOARD

1983 Summer Study

on

JOINT SERVICE ACQUISITION PROGRAMS

February 1984

OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH & ENGINEERING

Washington, D. C. 20301

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

DEFENSE SCIENCE
BOARD

17 April 1984

MEMORANDUM FOR THE SECRETARY OF DEFENSE

THROUGH: UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

SUBJECT: Defense Science Board (DSB) 1983 Summer Study on Joint Service Acquisition - INFORMATION MEMORANDUM

The DSB Summer Study on Joint Service Acquisition, co-chaired by Admiral Isaac C. Kidd, Jr., USN (Ret.) and Mr. Robert A. Fuhrman, has completed its work and submitted its final report. The study panel consisted of distinguished experts from the Services, OSD, JCS, industry, and Congress.

The panel was tasked to examine past and present joint Service acquisitions and ascertain why some joint efforts succeeded while others failed. They were also tasked to recommend management changes to increase the motivation for Service support of joint programs and to improve the effectiveness of joint acquisition programs. This study is very important since there are increasing requirements for combining Service capabilities effectively, as well as the long established need to reduce redundant acquisition efforts among the Services.

This report concludes that problems in joint programs are most often caused by a failure of the Services to agree on requirements; "forced marriages" without this agreement; ad hoc environments in which joint programs are often established; and differing or shifting Service priorities during the development of joint programs. It also concluded that a formal, institutionalized process needs to be established to evaluate requirements, technology, programs, and issues to properly identify joint Service candidates.

This report has been approved by the DSB and I would direct your attention to the Chairmen's cover letter, the implementation plan, and the Executive Summary.

Charles A. Fowler
Chairman

Attachment:
DSB Report

OFFICE OF THE UNDER SECRETARY OF DEFENSE

WASHINGTON, D.C 20301

RESEARCH AND
ENGINEERING

20 March 1984

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Defense Science Board 1983 Summer Study on Joint Service Acquisition

Attached is the final report of the Defense Science Board Summer Study on Joint Service Acquisition. The primary conclusions of the study are:

- o There have been many successful joint programs. The most notable successes have occurred in non-major systems, subsystems, components, and technology base programs.
- o Major development joint programs are more prone to problems.
- o Problems in joint programs are often traced to : failure to agree on requirements, forced marriages, ad hoc environment, and differing priorities or shifts in service priorities.
- o A formal, institutionalized process should be established to evaluate requirements, programs, issues, and technology to select joint service candidates and to resolve disputes.
- o Joint technology base programs are running reasonably well with the only improvement needed being technical information dissemination.
- o The large ($\geq$ \$100M) DARPA technology demonstrations need stronger user involvement to better analyze military worth.
- o All joint service Full Scale Development programs should be single service funded. The executive service would be the one with the greatest need and priority.

The panel made various recommendations to improve joint service efforts and those recommendations are summarized in the Implementation Plan section of the attached final report. The five major implementation recommendations deal with:

- o Establishment of joint requirements and management board.
- o Issuance of new 5000 series directive.

- o Action on technical information dissemination and technology demonstrations.
- o Review of less than system level joint service acquisitions.
- o Navy career growth in joint program offices.

Isaac C. Kidd, Jr.
Admiral, USN (Ret.)
Chairman

Mr. Robert A. Fuhrman
Co-Chairman

IMPLEMENTATION PLAN

A. JOINT REQUIREMENTS AND MANAGEMENT BOARD (JRMB)

Recommendation: Establish permanent, formally chartered board to administer joint Service acquisition. JRMB would: be clearing house for all potential joint programs; be comprised of vice chiefs-of-staffs of four Services, Director of Joint Staff, and appropriate OSD official; meet periodically (monthly or quarterly); be supported by small permanent staff; be patterned after JLC; consider providing annual reports to Congress; seek opportunities for joint development; screen candidates; recommend alternative programs; and reconcile issues between requirements and technology.

JRMB procedures would include: chartering of special study groups for configuration of SSG, reviewing of SSG findings, resolving of issues (Secretary final arbiter), recommending for or against joint development, initiating PPBS action, dissolving of SSG, establishing policy for training and logistics commonality, reviewing PPBS turbulence issues, consideration of items currently in production rather than new development, and consideration of monitoring the developing Service's work when a joint program is not recommended.

Action: JCS, Services, and OSD prepare a JRMB charter for Secretary of Defense approval.

B. NEW 5000 SERIES DIRECTIVE

Recommendation: Secretary of Defense promulgate a new 5000 series directive to institutionalize the joint Service acquisition process, so as to systematically evaluate requirements, program, and technology to converge on those candidates which possess the prerequisites for success as joint Service acquisitions. The decision to enter joint full scale development should be based upon the results of technology demonstrations and the formal joint requirements and management process. All joint full scale development and most 6.3B advanced development joint programs should be single Service funded except for Service peculiar items. The executive Service (lead Service) in joint Service acquisitions should be the one with the greatest need and priority. If the executive Service priorities greatly lessen, consideration should be given to changing the executive Service to that with the higher priority. If one joint partner withdraws from a cost shared program its current year/budget year/authorization year funds should be reallocated to the remaining partner's budget. For multi-agency programs such as DoD/NASA and DoD/FAA, the DoD should try to arrange for single agency funding and budget reallocation on ongoing joint programs where one partner withdraws. For international programs DoD should try to arrange for single country funding using the AMRAAM/ASRAAM approach. The executive Service should contract for spares and interim contractor support when appropriate. A joint program should have a single quality assurance program, a single change control program, and single acceptance test program with common documentation to contribute to a smooth production flow.

Action: OSD in coordination with JCS and Services prepare a new directive on joint Service acquisition for Secretary of Defense issuance.

C. TECHNICAL INFORMATION AND TECHNOLOGY DEMONSTRATIONS

Recommendation: OUSDRE(R&AT) should take actions to improve and speed up technical information dissemination between the Services, between DARPA and the Services, and especially between DoD and industry. A military impact analysis by the involved Service(s) should be required before initiation of large technology demonstrations. The results of this analysis should be one of the factors considered in determining whether the "demo" should take place. DARPA should continue a vigorous program of technology demonstrations but plan for iteration and evolution of the idea with stronger user participation.

Action: OUSDRE(R&AT) memorandum to DARPA and the Services.

D. REVIEW OF LESS THAN SYSTEM LEVEL JOINT SERVICE ACQUISITIONS

Recommendation: Joint Logistics Commanders should establish a formal mechanism for review and selection of joint acquisition below the system level. Oversight should be provided by annual report to USDRE and a summary report could also be provided to Congress.

Action: USDRE memorandum to JLC.

E. NAVY CAREER GROWTH IN JOINT PROGRAM OFFICES

Recommendation: The Navy should implement remedial action to minimize internal perceptions of joint program office duty being inhibiting to Navy career growth.

Action USDRE memorandum to Navy.

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EXECUTIVE SUMMARY

During the spring of 1983, Dr. R. D. DeLauer, Under Secretary of Defense for Research and Engineering, chartered the Defense Science Board (DSB) to study the effectiveness of joint Service acquisition programs. That tasking noted that there will be an increasing number of joint Service programs because of demands for more joint warfighting, the need to preclude redundant acquisition (i.e., save money), and the concern that new technology does not necessarily respect traditional Service boundaries (e.g., space). The summer DSB was to examine past and present joint Service acquisitions and then recommend changes so we might formulate and execute them more effectively thereby allaying recently expressed Congressional concerns.

Four sub-panels were formed: Policy, Requirements, R&D, and Management/Logistics/Production. Chapters I through IV of this report contain the individual final reports of each of these four sub-panels. Each Chapter has its own sub-panel conclusions and recommendations. In summary, the major conclusions are:

- There have been many successful joint programs with prospects favorable for several current joint programs. These successes outnumber failures or problem programs by a large margin.

- While certain types of joint programs are more difficult to prosecute than their single-Service alternatives, there are no problems that apply to all joint programs. In other words, different problems apply to different programs.

- Joint programs have been most notably successful in non-major systems, subsystems/components and science and technology categories.

- Major development joint programs are more prone to problems than other types of joint programs or their single-Service counterparts.

- Those programs that have experienced, or are experiencing, problems can be traced to the following: (a) Failure to adequately invoke the joint requirements and management process. All too often the problem programs were forced from the top too quickly. (b) Ad hoc environment to select joint programs, select the lead Service, and organize a management structure. (c) Differing priorities or shifts in Service priorities due to changing budgets and/or perceived threats, leading to turbulence in programs.

- The ad hoc manner in which joint programs are initiated is not consistent with sound, stable programs. This leads to confusion and missed opportunities.

- A formal, institutionalized process should be established by which the DoD community can systematically evaluate require-ments, programs, issues, and technology to converge on those candidates which possess the "prerequisites" for success, and to resolve disputes among the partners once a joint program is underway.

- The issues to be resolved before launching a joint program include: operational concepts, performance specifications, technical approaches, constraints, acquisition strategy, cost and schedule, relative worth, and management structure.

- Joint development should only be undertaken when it is necessary from an operational standpoint or it is clearly attractive from a cost standpoint.

- The necessary participants in the joint requirements process are: OSD, JCS, Unified Commanders, Services, and Technology (industry, DARPA, Service laboratories, allies).

- Differences in Service missions, operating environment, technical expertise and sense of priority all make agreements on requirements and management of Joint Programs very difficult to achieve.

- Many technology base programs are joint or coordinated in a joint manner. They are progressing reasonably well and are able to manage problems created by one Service reducing its technology base funding. Improvement is needed in technical information dissemination.

- "Technology push" is a vital part of the R&D process. The DARPA "technology demonstrations" provide this mechanism and are an important aspect of our overall R&D capability and should continue. In most cases, a series of evolutionary "learn-by-doing" demos, with stronger user involvement, will be required to provide a fair and convincing measure of military worth.

- Wide use of a common subsystem, such as common FLIR sensors, could bring with it common vulnerabilities. Several solutions to a particular problem complicate the enemy's counter-measures problem.

- Joint acquisitions below the system level make significant contributions in economies, efficiencies and interoperability. It is likely there are additional opportunities that should be pursued.

- All joint full-scale engineering development programs, and most 6.3B advanced development programs should be single-Service funded. The executive Service would then have in its budget all the funds needed to carry out the program, except for other

Service-peculiar items. The executive Service would be the one with the greatest need and priority, and thus the one least likely to deviate from the plan. If the executive Service's priorities greatly lessen, consideration should be given to changing the executive Service (or Agency) to that with the higher priority, as was recently done on JVX.

- If one partner withdraws from the cost-shared program, its current year, budget year, and authorization year funds should be reallocated to the remaining partner's budget.

- For multi-agency programs such as DoD-NASA and DoD-FAA, the DoD should try to arrange for single-agency funding of new programs and budget reallocation of ongoing joint programs where one partner withdraws.

- For joint U.S./foreign programs DoD should try to arrange for single country funding—using the AMRAAM/ASRAAM approach.

- Improved joint service cooperation should require no additional resources because of eventual greater efficiencies and economies.

- Savings brought about by joint efforts can be maximized by continuing commonality in data, publications, test equipment, training, and spares as long as practicable.

- Single procedures for all operations affecting production will save money. These procedures include: change control, quality inspections, and acceptance specifications.

The above major conclusions have corresponding recommendations included in the sub-panel reports of Chapter I through IV. Those recommendations are summarized in the Implementation Plan, pages vii and viii.

CHAPTER I - POLICY SUB-PANEL REPORT

I - Introduction

A. Tasking

Joint Service Acquisition Programs have been studied numerous times in the past several years by various organizations. The interest does not have academic roots, however. It stems from the very real desire on the part of Congress and the Department of Defense (DoD), including the Services, to save money and enhance their operational capabilities. Also, new technology does not always respect traditional Service boundaries. But the perception of joint programs is that they simply do not work. Arguments like "there are too many players" and "requirements are different for the Army and Navy" are often heard. Whether this negative perception represents reality or not is almost secondary since some key people believe it is true. This belief has led to a lack of confidence, by Congress and others, in the Services' ability to pursue and implement joint programs.

It was for this reason as well as a real commitment to make joint programs work that Dr. R. DeLauer, Under Secretary of Defense for Research and Engineering (USD) asked the Defense Science Board (DSB) to study this issue once again. He asked the DSB to forward recommendations that address the problems in joint programs while emphasizing their strengths. The tasking also asked, in essence, that the Board sift through past and current joint programs to sort fact from perception. This sifting process could then better focus the Board's efforts on ameliorating the real problems.

B. Staffing

To accomplish this task, Dr. DeLauer, along with the DSB chairman, Mr. Norm Augustine, asked Admiral Isaac C. Kidd, Jr. (RET) and Mr. Robert Fuhrman to co-chair a panel composed of DSB members, consultants, Service representatives, and others. The panel contained personalities with varied and distinguished careers. This composition assured that all parties - Services, OSD, JCS, industry, Congress - would have a fair hearing and that an objective analysis would be conducted.

C. Organization

With the panel formed, the chairman established four sub-panels to attack the problem. Mr. Vincent Cook was asked to chair the Policy sub-panel while General DePuy (RET), Mr. Charles A. Fowler, and Mr. Nick Petrou chaired the Requirements, R&D, and M&P sub-panels, respectively. Each of the members of the study shown in Table I-1 were assigned to one of the four sub-panels.

Table I-1. Summer Study Participants

DSB MEMBERS
Adm Isaac C. Kidd, Jr., USN (Ret.)
Chairman

Mr. Robert A. Fuhrman
Co-Chairman

Mr. William A. Anders
Dr. Ivan L. Bennett
Ms. Flaine R. Bond
Mr. Vincent N. Cook
Gen William E. DePuy, USA (Ret.)
Mr. Charles A. Fowler
Dr. Eugene G. Fubini
Mr. David R. Heebner
Dr. Harold W. Lewis

CONSULTANT MEMBERS
Cong. Robert W. Daniel (Ret.)

JCS/SERVICE REPS
BGen Joe L. Breedlove, USA
VAdm Robert R. Monroe, USN
MGen Jasper Welch, USAF
LGen Philip D. Shutler, USMC (Ret.)
RAdm D. Linn Felt, USN

OTHER PARTICIPANTS
Mr. Robert E. O'Donohue
Mr. Nicholas Petrou
Gen Alton D. Slay, USAF (Ret.)
VAdm E. R. Seymour, USN (Ret.)
RAdm R. G. Freeman, USN (Ret.)

EXEC SECRETARY
Mr. John L. Smith
Mr. David K. Anderson

DSB MIL ASST
LCdr Ralph E. Chatham, USN

WORKING GROUP

Maj Anthony J. Ammendolia, USA
Maj John C. Grimsley, USA
Cdr David Nordean, USN
Dr. Thomas Weathers
Dr. Bohdan Denysyk
LtCol Thomas E. Mansperger, USAF
Mr. Daniel A. Ruskin
Capt William L. Vincent, USN

D. Policy Sub-Panel Activities

The Policy sub-panel was tasked to study cross-cutting issues (funding, Congressional involvement, etc.) and policy guidance. The Policy sub-panel was also tasked to help start the study process by generating a series of issue papers dealing with the breadth of joint programs and by producing a discussion paper that defines the limits of the study. The 20 initial issues generated by the Policy sub-panel are available in the DSB files.

E. Schedule

In addition to generating issues prior to San Diego, the Panel Chairman scheduled several meetings in Washington to take testimony from various interested parties and experts and to review completed work. The following shows a schedule, and general content of the various meetings held in Washington.

Date	Participants	Contents
6,7 June	Full Panel	Briefing from Congressional Staff, Adm. Locke (Ret), Consultants

Date	Participants	Contents
23 June	Policy sub-panel and other sub-panel Chairmen	Review Scope Paper and Issues
28-29 June	Full Panel	Briefings from Army, Navy, Air Force and Marines
14-15 July	Full Panel	Briefings from Program Managers, Adm. Freeman (RET), DARPA Experts

Various programmatic briefings were also given in San Diego. These included JVX, (Advanced vertical take-off aircraft H-60 (helicopter), DARPA and Modular FLIR. In short, before the Panel left San Diego, it had heard from a representative cross-section of parties interested in joint programs.

II - Definition and Program Selection

A. Introduction

As in most studies of this nature, the terminology and extent of the study must be defined. Care must be taken so that an objective study is conducted and meaningful, realistic results emerge from the effort. An overly broad definition of a joint Service Acquisition — all programs where two or more government components work together for an unspecified length of time — would demand a protracted study with vague and broad results. On the other hand, narrowly constructed definition — major development programs where two or more DoD Services cooperate/link together for the entire duration of the life cycle of a system — may lead to a self-fulfilling prophecy and wrong conclusions regarding the merits of "joint" programs. This latter definition was adopted by the GAO in a recent study on Joint Service Acquisition.

B. Categories of Joint Programs

Joint programs can be broken conveniently into four categories:

1. Major Systems: Those systems that meet the definition of major systems as defined in DoD Directive 5000.1, Major System Acquisition.

2. Subsystems and Non-Major Systems: Those complete, fully functioning systems that do not meet the criteria of a major system in Directive 5000.1 or those constituent elements of a major or non-major system that perform a major function (gas turbine engine) of a complete system or constitute a significant portion of the complete system's value.

3. Component: Those constituent elements of a complete system or subsystem that constitute a small portion (less than 5%) of the value of the system or subsystem and perform a generic function (seeker, microprocessor, etc.) or a function that can easily be adapted to a system other than the one it was developed for. This category could also include generic items procured in large quantities by the Services for administrative and basic needs in facilities management, such as truck tires.

4. Technology: Those research and development programs falling within funding categories 6.1, 6.2, or 6.3a that will advance the state-of-the-art in a specific military mission but without necessarily proceeding beyond the prototype or pre-prototype stage (High Energy Laser).

Each of the four program types defined above represents significant activity areas in the acquisition process and should therefore be accommodated in general definition with the exception of a portion of "component" category. Joint acquisition of basic needs (shoes) and administrative necessities (typewriters) has occurred since, at least, the War of 1812. For the most part, these joint acquisitions proceed smoothly and are driven primarily by economics and regulations. It was decided, therefore, that the DSB would not examine these component programs but rather concentrate on component programs that perform a generic function in a system or subsystem.

C. Governmental Components Involved

The "who" of a joint program is equally important to define. Joint programs exist between: 1) DoD and other U.S. Government agencies, 2) non-DoD U.S. Government agencies (State and Treasury), 3) DoD and other nations, etc. Since the study is being conducted under the auspices of the DSB, it was decided to limit the programs studied to only Defense programs wholly in the DoD community. Additionally, it was decided that programs whose main or substantial thrust is international in scope be excluded from the study. This study, therefore, focused on programs conducted between two or more DoD components (Services plus DNA, DARPA, NSA, etc.).

D. Phases of Joint Service Participation

Another issue that requires some examination is the phase of the program itself. Traditionally a program has been divided into four segments: 1) Concept Exploration (CE), 2) Demonstration and Validation (D&V), 3) Full Scale Development (FSD) and, 4) Production and Deployment (P&D).

Some students of joint programs have defined "joint" as those that connect DoD components during all of these phases, or at least most of them. But each segment by itself often represents a substantial effort. Limiting the DSB Study to programs that are connected for at least two of the four phases would be an injustice, since the same benefits can accrue (commonality, cost savings, etc.) if there is joint involvement in only one of the phases. Also, certain programs may only lend themselves to one phase of the acquisition cycle. For example, a single Service may already have developed a system which another Service procures or certain technology

programs may only survive through concept evaluation. In short, the DSB Panel study decided to examine all defense programs that start or exist as joint efforts during any of the phases.

E. General Definition

The preceding discussion results in the following definition of Joint Service Acquisition programs:

> Any Defense system or technology program that substantially (formal coordination, direction, and/or funding) involves more than one DoD component during any or all of the four major phases of a system life-cycle in a planned and systematic fashion for the purpose of gaining one or more of the hoped for benefits in performance, cost, readiness, or operations.

F. Program Selection for In-Depth Study

Table I-2 presents a list of 68 programs that fall within the general definition presented for this study. All were studied to assess whether the program was "successful," "problematic," or a "failure".

Table I-2. Joint Programs Studied

PROGRAM	PARTICIPANTS	DESCRIPTION
A-7	N, AF	ATTACK AIRCRAFT
ADA	A, N, AF	COMMON PROGRAMMING LANGUAGE
AFSATCOM	A, N, AF	AIR FORCE SATELLITE COMMUNICATIONS PROGRAM
AIM-7	N, AF	SPARROW MISSILE
AIM-9	N, AF	SIDEWINDER MISSILE
AIRCREW MASK	A, AF	CHEMICAL DEFENSE MASK
AMRAAM	N, AF	ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE
APG-66	A, AF	F-16 RADAR
ASPJ	N, AF	AIRBORNE SELF PROTECTION JAMMER
ASMS	A, N, AF	ADVANCED STRATEGIC MISSILE SYSTEMS
APSI	N, AF	AIRCRAFT PROPULSION SUBSYSTEMS INTEGRATION

Table I-2. Joint Programs Studied (continued)

PROGRAM	PARTICIPANTS	DESCRIPTION
ATEGG	N, AF	ADVANCED TURBINE ENGINE GAS GENERATOR
AWACS*	AF, NATO	E-3A AIRBORNE WARNING AND CONTROL SYSTEM
BIG EYE	N, AF	CHEMICAL MUNITION
BISS	A, N, AF	BASE AND INSTALLATION SECURITY SYSTEMS
CBDE	A, N, AF	CHEMICAL/BIOLOGICAL DEFENSE EQUIPMENT
COBRA JUDY	A, N, AF	RADAR PROGRAM
CUCV	A, AF, MC	COMMERCIAL UTILITY CARGO VEHICLE
CRUISE MISSILE	N, AF	FAMILY OF AIR BREATHING LONG-RANGE MISSILES
DMSP	A, N, AF, MC	DEFENSE METEOROLOGICAL SATELLITE PROGRAM
DSCS	AF, DCA	DEFENSE SATELLITE COMMUNICATION SYSTEM
FAE	N, AF	FUEL AIR EXPLOSIVES
FIREBOLT	N, AF	AERIAL TARGET
FLTSATCOM	N, AF	FLEET SATELLITE COMMUNICATIONS PROGRAM
F-4	N, AF	TACTICAL FIGHTER
F-15 ENGINE	N, AF	GAS TURBINE ENGINE FOR F-15 AIRCRAFT
F-16*	AF, MULTI-NAT'L	TACTICAL FIGHTER
F-111	N, AF	VARIABLE GEOMETRY FIGHTER AIRCRAFT
GPS	A, N, AF, MC NATO, DMA	GLOBAL POSITIONING SYSTEMS

* Single Service Development/Int'l Program: Not Studied in Detail

Table I-2. Joint Programs Studied (continued)

PROGRAM	PARTICIPANTS	DESCRIPTION
GUAYULE RUBBER	A, N, AF	DOMESTIC RUBBER SOURCE
HARM	N, AF	HIGH SPEED ANTI-RADIATION MISSILE
HEL	A, N, AF, DARPA	HIGH ENERGY LASER
HELLFIRE	A, MC	LASER GUIDED MISSILE
HH-60	A, N, AF	COMBAT RESCUE HELICOPTER
HMMWV	AF, MC	HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE
IFF (MKXV)	A, N, AF	COMBAT IDENTIFICATION FRIEND OR FOE
IR AND LASER MAVERICK,	N, AF	INFRARED MAVERICK
JCMC	A, AF	JOINT CRISIS MANAGEMENT CAPABILITY
JINTACCS	A, N, AF, MC	JOINT INTEROP TACTICAL C^2 SYSTEMS
JSSAP	A, N, AF	JOINT SERVICE SMALL ARMS PROGRAM
JSTARS	A, AF	JOINT SURVEILLANCE TARGET & ATTACK RADAR SYS.
JTACMS	A, AF	JOINT TACTICAL MISSILE SYSTEM
JTIDS	A, N, AF, MC	JOINTS TACTICAL INFORMATION DISTRIBUTION SYSTEMS
JTF	A, N, AF, MC	JOINT TACTICAL FUSION
JVX	N, AF, MC	JOINT ADV. VERTICAL LIFT AIRCRAFT
LAV/MPGS	A, MC	LIGHT ARMORED VEHICLE/MOBILE PROTECTED GUN SYSTEM
MAAS	N, AF	MOBILE AIRCRAFT ARREST SYSTEM
MAN TECH	A, N, AF, NATO	MANUFACTURING TECHNOLOGY
MATE	A, N, AF	MODULAR AUTOMATIC TEST EQUIP.
MILSTAR	A, N, AF, MC	MILITARY SATELLITE COMM. PROG.

Table I-2. Joint Programs Studied (continued)

PROGRAM	PARTICIPANTS	DESCRIPTION
MMER	A, MC	MEDIUM MORTAR EXTENDED RANGE
MOD FLIR	A, N, AF	MODULAR FORWARD LOOKING INFRARED
MRASM	N, AF	MEDIUM RANGE AIR-TO-SURFACE MISSILE
	N, AF	MULTIPLE STORES EJECTOR RACK
MTS	A, N, AF, MC	MOBILE TACTICAL SHELTERS
OBOGS	To be Determined	ON-BOARD OXYGEN GENERATION SYSTEM
PLSS	A, AF	PRECISION LOCATION STRIKE SYSTEM
SENTINEL BRIGHT	A, N, AF, NSA	CRYPTO TRAINING EQUIPMENT
SHRIKE	N, AF	ANTI-RADIATION MISSILE
SIMULATOR PROJ 2851	A, N, AF	STANDARD DATA BASE SYSTEM
SINCGARS	A, AF, NATO	SINGLE CHANNEL GROUND & AIRBORNE RADIO SUBSYSTEM
SPACE BOOSTERS	N, AF	LAUNCH VEHICLES
SPACE SHUTTLE*	AF, NASA	REUSABLE ORBITER
STANDARD ARM	N, AF	ANTI-RADIATION MISSILE
TIPI/MAJIC/ MAGIS	A, N, AF, MC	INTELLIGENCE PROCESSING
TRI-TAC	A, N, AF, MC	JOINT TACTICAL COMMUNICATIONS
VHSIC	A, N, AF	VERY HIGH SPEED INTEGRATED CIRCUITS
WIS	A, N, AF, MC	WWMCCS MODERNIZATION

* Single Service Development/Int'l Program: Not Studied in Detail

Joint programs were identified by a combination of Service, OSD, and Study Panel members' research. The Services were then invited to present briefings at a Panel meeting (July 14-15, 1983) on their respective joint programs. These briefings provided some insight into the usefulness of the programs as case studies. In addition to these briefings, the Services and OSD were asked to respond to a questionnaire that addressed key aspects of joint programs.

III - Discussion of Policy Sub-Panel Issues

A. Issue Development

At the start of the DSB study, the Policy sub-panel produced 20 issue papers that dealt with most areas of joint programs: policy, management, requirements, funding, personnel, etc. These initial issues, served as "seeds" for the study process. During the last weeks prior to San Diego, those issues were expanded to eight. The eight issues are summarized below: 1) Joint program selection criteria (including a "flow" diagram suggesting a new process), 2) Advocacy, dispute resolution and formation (including a proposed organization structure to screen joint programs), 3) Personnel selection and motivation, 4) Stabilization of funding, 5) Identification of "natural" joint program types, 6) Incentives and penalties to form and/or disband joint efforts, 7) Need and method for Congressional involvement, and 8) Broad policy guidance. After the first few days in San Diego, these eight Policy Sub-Panel issues were narrowed to two: 1) What is the extent and scope of the problem? and, 2) Should a permanent, formal body be established to deal with the joint programs?

All of the eight issues were dealt with by transferring them to other Sub-Panels or absorbing them into the two remaining Policy Sub-Panel issues. The following subsections provide a more detailed discussion of the two issues on which the Policy sub-panel concentrated.

B. Scope of the Problems with Joint Programs (First Issue)

1. Issue

The policy sub-panel first grappled with the issue of defining the scope or size of the "problem" with joint programs.

2. Background

The numerical gap that will continue to exist between NATO and Warsaw Pact Forces must be compensated for by technology, efficient use of funding resources, and innovative use of forces. Joint programs offer the potential to save resources and increase military effectiveness. Clearly, joint systems and operations can be synergistically structured to optimize our posture. But pursuing these joint efforts is not without problems; it sometimes seems that problems grow exponentially with the number of participants!

Despite these problems, more often than not, the problems have been overcome by the participants. But to listen to some critics, most notably the GAO, one would think that there have been no successes. The GAO went as far as to say that there have been "no successful" joint programs. They cited reasons such as Service parochialism, "not invented here" syndrome, and loss of control as reasons for failure. Their conclusion is not surprising, however. First the GAO only examined a limited number (15) of programs; second, most of the selected case studies (F-111 and JVX) were, or are, problem programs with troubles stemming usually from real doctrinal/requirements differences.

Based on the experience of the DSB Study Panel, it was difficult to believe that there have been no successes. Sixty-eight joint programs (Table II-1) were identified and examined. These ranged from technology efforts to production, and from tactical aircraft to missiles and components. In addition, there were a variety of funding and management structures. Our criteria for success was: a) Over 50% commonality, b) System/Components fielded in large numbers, c) Goals achieved without major (over 2 years) schedule slippages. Using these criteria, the working group determined that about two-thirds of the programs were "successes" or had good prospects for success.

In the group of 68, approximately half were either non-major systems, subsystems/components, or technology programs. It was in these subgroups where most of the 'successes" occurred. These joint programs lack visibility, proceed reasonably smoothly, and are started by DoD to counter a perceived threat, save money, or enhance the technology base. Examples include VHSIC, APSI, ATEGG, ADA, Guayule rubber, BISS, MATE. That is not to say that there have been no problems with subsystem joint programs. The F-15 engine is a good example of a subsystem joint effort that became a single Service program. The problem, in this case, can be traced to high technical risk and dissimilar requirements. The high degree of success in these programs stems primarily from the fact that: 1) The front end work was adequately done, and, 2) The Services agreed on the approach.

With major development programs there have been successes and failures. Even though these programs are prone to problems, there is no single cause. Items such as the following dominated: a) No initial agreement among Services or with OSD/Congress on requirements and doctrine; b) Differing service priorities, or shifts in service priorities due to changing budgets and perceived threats; and c) Ad hoc environment to select lead service, management, review etc.

Problems with such programs as the F-15 engine, Joint Interdiction, JVX, Light Armored Vehicle can be traced to the three areas identified above.

3. Conclusions

Based on the preceding discussions, the Panel concluded the following regarding the extent and scope of the "problem" with joint programs: a) Joint

programs will become increasingly important as the U.S. and its NATO allies build conventional forces to raise the nuclear threshold. Joint programs can both save resources and incorporate more effective approaches. b) While certain types of joint programs are more difficult to prosecute than their single Service alternatives, there are no problems that apply to all joint programs. c) There have been many successful joint programs with prospects favorable for several current joint programs. These successes outnumber failures or problem programs by a large margin. d) Joint programs have been most notably successful in non-major systems, subsystems/components and science and technology categories. e) Major development joint programs are more prone to develop problems than other types of joint programs or their single Service counterparts. But even here, the problems are on a case-by-case basis instead of being generally associated with a particular class. f) Those programs that have experienced, or are experiencing, problems can be traced to the following: (1) Failure to adequately invoke a joint requirements and management process. All too often the problem programs were forced from the top too quickly. (2) Ad hoc environment to select joint programs, select the lead Service, and organize a management structure. (3) Differing priorities or shifts in service priorities due to changing budgets and/or perceived threats, leading to turbulence in programs. g) Finally, the ad hoc environment leads to confusion and missed opportunities.

C. Formation of Joint Requirements and Management Board (JRMB)

1. Issue

As a second Policy issue, the sub-panel explored the question of whether it made sense to establish an organization and a systematic and formal process to evaluate and select candidates for joint programs.

2. Background

As previously mentioned, the analyses revealed that virtually all instances of failures in joint programs stemmed from the fact that little or no attention was paid to the front end work so necessary to establish a firm foundation for a joint program. Either the prospective parties were not consulted on common requirements, or the relative priorities of the partners were sufficiently divergent that future funding problems were virtually inescapable. Further analysis revealed that these deficiencies generally resulted from the ad hoc manner in which the decision was made to embark upon a joint program. Quite often the "marriage was forced" in a downward direction from OSD or Congress. Also, on some programs, even when the Services agreed to merge, the process was often very imprecise, leading to problems downstream.

The Panel felt that one of the reasons for this situation was that little or no formal policy or direction exists. DoD Directive 5000.1 and DoD Instruction 5000.2, which provide policy and implementation instructions for DoD Systems Acquisition, provide no specific implementation guidance for joint

Service acquisition. Finally, Congressional skepticism in the ability of the Department of Defense to implement and manage joint programs seems to demand some change in the way these programs are approached.

3. Conclusions

The sub-panel came to two conclusions: first, that the ad hoc manner in which joint programs are initiated is not consistent with sound, stable programs. Second, formal, institutionalized process should be established by which the DoD community can systematically evaluate requirements, programs, and technology to converge on those candidates which possess the "prerequisites" for success, and to resolve disputes among the partners once a joint program is underway.

4. Recommendations

Therefore, we recommend that the Secretary of Defense promulgate a modification of the 5000 series directives to institutionalize such a process and organization.

As the key organizational element to administer such a process, the sub-panel recommended that permanent, formally chartered board be established, which was named the "Joint Requirements and Management Board" (JRMB). This board will be the "clearing house" for all potential joint programs. In other words, it will seek out opportunities for embarking on a joint program, sponsor sufficient requirements and management analyses to promote confidence that the program will succeed, and resolve any disputes that arise on sponsored programs.

The composition of the board must meet two criteria: first it must be comprised of those responsible for defining requirements and developing the capabilities, namely the Services, JCS, and an appropriate OSD official; and second, the board must be of sufficiently high level to ensure that decisions can be implemented. The sub-panel recommended that the board membership consist of the vice chiefs-of-staff, or equivalent, of the four Services, the Director of the Joint Staff, and an appropriate OSD official. This board would meet periodically (possibly monthly or quarterly) and would be supported by a permanent staff (secretariat) supplied by the Services, JCS, and OSD. This staff, much like that supporting the Joint Logistics Commanders(JLCs), could consist of a colonel along with field grade officers from each Service and OJCS, supported by appropriate administrative personnel. Their job would be to select agenda items, ensure appropriate staffing and tasking is accomplished, and prepare decision papers and reports. Specific technical analyses, studies, and concept work would be tasked to the institutions already in existence which are chartered to provide such support, namely the Services and the JCS. Additionally, agencies such as DARPA, and DCA would be involved as required. Parenthetically, if this organizational structure sounds familiar, it is patterned almost entirely after that very successful structure utilized by the Joint Logistics Commanders.

The Joint Requirements and Management Board (JRMB) should be responsive to the concerns of Congress. The JRMB would employ a visible and institutionalized process of evaluating programs for "jointness" potential, selecting and rejecting programs for joint management with a full justification of each decision. Also, Annual Reports of rejections and approvals would allay Congressional concern that the interest in joint programs is not genuine and ongoing.

In summary, the sub-panel strongly felt that some formal systematic process, with the concomitant organizational structure, is necessary and that the process and structure proposed here can effectively bring order to a process that has hitherto been ad hoc in nature. Finally, the sub-panel felt that the members in such an organization must possess the proper charter and must be at the proper level to ensure that decisions made represent the position of their department or agency and that, once the decisions are made, they will be effectively executed.

CHAPTER II - REQUIREMENTS SUB-PANEL REPORT

I - Introduction

A. Case Studies

The sub-panel participated in meetings and received briefings in Washington prior to the two week meeting in San Diego. The sub-panel, also undertook some case studies which had special relevance to the requirements aspects of joint development. The case studies were: F-111, Cruise Missile, Joint Tactical Information Distribution System (JTIDS), Light Armored Vehicle (LAV-25), Joint Tactical Fusion Program (JTFP), Joint Surveillance and Target Attack Radar (JSTARS), and Joint Tactical Missile System (JTACMS).

B. Joint Requirements and Management Issues

The testimony of those witnesses who appeared before us and the clear implication of our case studies pointed unmistakably to the importance of starting a Joint Program on the right foot by resolving requirements issues at the outset. Indeed, those issues should be settled before a Joint Program is launched. If they cannot be resolved, there is no viable basis for proceeding jointly. However, we quickly came to find that this front-end process involves far more than requirements and extends deeply into technical and management issues as well. The panel as a whole labeled the process JRM (Joint Requirements and Management). The scope of that process is outlined later in this chapter.

Based on our case-studies and those of the other sub-panels we identified a number of major joint development programs which suffered a variety of aborts, restarts, delays and increased costs because the JRM process was either not performed at all, or not performed properly: F-111, SETA/JTFP, JSTARS, and High-Speed Anti-Radiation Missile (HARM).

On the other hand when the JRM work is done at the front-end of the Joint Development process, programs seem to have a reasonable chance of success. For example: AIM-9L, Airborne Self Projection Jammer (ASPJ), MILSTAR, Advanced Medium Range Air-to-Air Missile (AMRAAM), High Mobility Multi-purpose Wheeled Vehicle (HMMWV), and Defense Satellite Communications System (DSCS).

Sometimes failure to resolve JRM issues, even when the process is undertaken properly at the front-end, and a decision not to go "joint" should be regarded as a success for the process. For example: the decision to proceed separately with the F-16 and F-18 programs should be taken as a successful action, not a failure.

When a second Service decides to hop aboard an ongoing development, it is obvious that the JRM work cannot be done at the front-end but, nonetheless, must be done at the point and time of entry. Examples:

- Air Force adoption and adaption of the Navy F-4,
- Air Force and Navy utilization of the Army UH-60 Blackhawk helicopter,
- Air Force (and perhaps Navy) adaption of the Marine TAOC.

II - Joint Requirements Process

A. Prerequisites for Joint Programs

From these examples we conclude that the resolution of JRM issues is a pre-requisite to Joint Programs success. Having concluded that the JRM process is essential, we examined the nature of that process. The objective, it seems clear, is to structure a Joint Program which will:

- o Increase military effectiveness,
- o If possible, achieve efficiencies and economies,
- o Exploit technology,
- o Be credible to the Congress and the public.

There is an old persistent debate about whether the requirements process originates in a "Technology Push" or a "Requirement Pull." Most successful programs have mixed parentage. The sub-panel doesn't really care how the idea germinates, as long as a reconciliation between requirements and technology takes place. The reconciliation process is the essence of JRM. We note that:

- o The process is circular and interactive. It is a marriage or mating dance between new technology and new technical approaches to military needs.
- o It must produce a reliable and affordable system.

In weapons system acquisition terminology, JRM is a concept definition effort. It should carry the program through RFP and DSARC 1. After careful, but not exhaustive, examination of case studies, we concluded that the issues to be resolved prior to launching a Joint Program include at least the following:

- o Operational concepts,
- o Performance specifications (including interoperability and supportability),
- o Technical approaches and options,
- o Configuration constraints,
- o Acquisition strategy,
- o Cost and schedule,
- o Relative worth vis-a-vis current and alternative systems,
- o Management structure.

This list is based upon evidence that one or more Joint programs came unglued because one or more of these issues remained unresolved at the time of program initiation. A few examples illustrate our method:

- o Operational concepts - JTACMS has been unable to get off the ground because the underlying operational concepts are unresolved. Specifically, the range of the Army's Corps Support Weapons System (The Army's JTACMS) has not been settled. The Air Force sees roles and missions implications in a long-range Army interdiction missile.

The Army might settle for a shorter range missile for reasons of economy and a missile tailored to support its scheme of maneuver. OSD, however, wants a longer range Army missile in support of the "Counter Air 90" concept. As we shall explain later, this is a case for JCS involvement (intervention). If the JCS wants the Army to assist the Air Force in the attack of airfields, in deep suppression of enemy air defenses (SEAD), or in other deep attack roles, it should say so. OSD efforts to resolve these critical joint operational issues have been less than successful. In the meanwhile, the JTACMS program is stalled.

- o Configuration - The Navy concluded that the F-111 was not suitable for carrier operations and went its own way.
- o Service Priorities - It turns out that the Army's need for JVX was of a radically lower priority than that of the Marines. As a consequence, the Army has been trying to jump ship.
- o Management Structure - A major hiccup occurred in the Cruise Missile Program when management of the SLCM and ALCM was separated.

There are those who believe that this list represents unsurmountable obstacles to joint development. When these kinds of issues are not addressed at the front-end or are papered-over, they come back to plague the program downstream. At that time program interruptions cost more money, cause budget and program perturbations, and induce a loss of Congressional and public confidence. Short-cutting the process has proven to be a mistake.

We believe that the list of issues is supported by experience and that it represents a minimum list of pre-requisites for Joint Program initiation. There is an important corollary to this conclusion. It is safe to say that agreement on all these pre-requisites will be neither automatic nor easy. Furthermore, joint management, as explained by the sub-panel on production, is a complex operation loaded with potential problems. Therefore, joint development should only be undertaken when it is necessary from an operational standpoint, or is clearly attractive from a cost standpoint.

B. Participants in the Joint Process

Assuming general agreement in our proposition up to this point, the question arises as to the necessary participants in the JRM process. No doubt, arising at least in part out of frustration with the Services' resistance to certain Joint development proposals and programs, there are a number of officials and by-standers who believe that the Services are not the real operators/users, and that only the Unified Commanders and their commands fit this description.

The sub-panel believes that there are five legitimate points of view which must be heard in the JRM process, depending upon the nature and "jointness" of the program:

- o OSD
- o JCS
- o Unified Commanders
- o Services
- o Technology - OSD, Industry - Other government Agencies.

1. OSD - Is ultimately responsible for all defense objectives and programs - issuing guidance for programing and budgeting and establishing rules for management practices and procedures.

2. JCS - Is responsible (by law - Title 10) for establishing doctrine for unified operations and training, - for servicing material and personnel requirements in accordance with strategic plans. By regulation, (5100.1), JCS is charged with preparing statements of military requirements and priorities including the relative importance of specific weapons. These responsibilities are reinforced by the fact that the JCS is the senior military authority to which issues of critical joint operational significance can be referred for resolution. If the JCS cannot or will not resolve such issues, they either remain unresolved or are resolved indirectly through program actions by OSD or the Congress, often on some basis other than operational considerations. Under the leadership of the chairman, (General John Vessey), the JCS is endeavoring to face up to these responsibilities. The sub-panel applauds this effort.

3. Unified Commands - Employ the forces prepared and supported by the Services, and bring to the requirements process the regional and operational viewpoint in the context of their assigned missions. The JCS has assigned responsibilities to the Unified Commanders for certain large joint mission areas. For example, General Rogers is responsible for operational concepts and associated weapons requirements for NATO Air Defense and Second Echelon Attack. Obviously, the Unified Commanders views must be heard in the JRM process for critical joint system development.

Too often in the past, the Joint Operational Commanders have been heard, if at all, only through their component commanders.

4. The Services

- o Organize, train, and equip the basic operating elements of the force, e.g., battalions, ships, squadrons, and landing teams.
- o Integrate these elements into the major force building blocks which are made available to the Unified Commanders:

  - Divisions and Corps
  - Wings and Air Forces
  - Battle Groups and Fleets
  - Amphibious Forces

- o Develop doctrine and tactics and train operators, maintenance personnel, and leaders to exploit weapons and win battles.
- o Although Unified Commanders combine these building blocks into operational forces in support of mission plans and objectives, only the Services are organized to produce them.
- o The Services must participate in the JRM process for every joint development program regardless of its motivation, i.e., for operational or for cost considerations.

5. Technology - There is a wide variety of sources for new or applied technology. They must be brought into the JRM process to interact with operational requirements. This input can come from one or more of the following sources:

- o Industry - The major source
- o OSD/DARPA
- o Service labs
- o Other Government agencies
- o Allies

C. JRMB Functions and Procedures

DARPA is a special case. Chartered to undertake advanced research and development in areas of high risk and high potential pay-off, which the Services would not otherwise undertake, DARPA particularly needs to participate in the JRM process before decisions are made to launch joint programs. The R&D sub-panel treats this problem in some depth.

We can now address the organizational approach to JRM and deal in a preliminary way with functions and procedures. A macro solution has been introduced by the policy sub-panel. Our approach arises out of the fact that we see three major categories of Joint Programs:

Category A - Those programs with critical joint operational significance. This really means that there are major joint operational issues which must be resolved at the front-end, and that the Services either have not, or are unlikely to, resolve them.

Category B - Those programs with joint operational dimensions, but programs in which the Services either have already resolved, or can be expected to resolve, the joint issues.

Category C - Those programs which have been undertaken solely for purposes of economy and efficiency. Needless to say, economies and efficiencies might also be associated with Categories A and B.

Certainly the JCS must assume responsibility for Category A bringing in the Unified Commanders as appropriate. The JCS should at least monitor Category B and intervene if necessary. Categories B and C remain the province of the Services jointly, and it is this which led us to a joint mechanism -the JRMB, introduced by the policy sub-panel in this report.

You will recall from Chapter I that the Joint Requirements and Management Board (JRMB) consisted of:

- o The four Service Vice-Chiefs with rotating chairmanship,
- o The Director of the Joint Staff,
- o Appropriate OSD official, and
- o A permanent secretariat.

We assume that there would be an element in the Office of the JCS to interact with the JRMB. The Vice Chief level was selected so as to subsume both the Requirements and Development agencies in the Services.

Having provided an organizational framework for JRM, let us turn to possible functions and procedures. Recognizing the initiatives being taken by the Chairman of the JCS, and wishing to support him in every way, we can see the likelihood that the JCS will identify certain programs of critical joint significance which are faced with conceptual difficulties and will wish to initiate the JRM process on its own. The JCS will probably be highly selective in this respect.

JRMB would constitute an essential joint Service mechanism performing these functions:

- Seek opportunities for joint development,
- Receive recommendations from all sources specifically including OSD, its staff and agencies.
- Screen candidate programs,
- Recommend additional or alternative programs for JCS sponsorship,
- Set the JRM process in motion for selected non-JCS programs.
- Assist JCS as required and requested.

1. JRMB Procedures

- Sponsors (JCS or JRMB or Services jointly and voluntarily) charter special study groups (SSG) to undertake front-end JRM process for selected joint programs.
- Sponsors configure SSG's to include the Service and/or JCS requirements agencies, development and acquisition agencies, and appropriate studies and analysis organizations. DARPA, DCA, NSA, or DNA would be involved as required.
- Sponsors review SSG findings, resolve issues as necessary -including management structure.
- Sponsors recommend for or against joint development and initiate appropriate actions in PPBS.
- Study groups dissolve and an approved management structure takes over.
- Problems occurring during development, such as effectiveness shortfalls, price increases or changing Service priorities, which cannot be resolved by the program manager or the executive agent (possibly a single Service) must go back to the sponsor (JCS or JRMB) for resolution and then if necessary to the SecDef directly or more likely, through a DSARC or DRB.
- SecDef is final arbiter.

There are some who have expressed the fear that we have made this JRM process too onerous. If there are ways to streamline it without losing its value and purpose, we are sure that DoD (in the large) will find them. But we must say that the problems we are addressing are both important and complex, and they will not go away.

2. Conclusion

With this kind of organizational approach and these kind of procedures we believe:

- Operational needs and new technology can be combined in viable Joint Programs, or
- It will be clear when joint development should not be undertaken.

3. Recommendation

- OSD incorporate the JRM process into the 5000 series of directives.

CHAPTER III - R&D SUB-PANEL REPORT

I - Introduction

A. Summary

The R&D sub-panel reviewed all aspects of the R&D process from the technology base through full-scale engineering development and identified four key issues. These four issues are concerned with:

- o The technology base,
- o "Technology push" programs, especially the DARPA-initiated "technology demonstrations,"
- o Joint Acquisition of subsystems, that is items such as aircraft engines and radios,
- o Funding of Joint Programs.

We also examined the issue of developing a "system of systems" for Joint (e.g., Unified) Commanders. This will be discussed later.

B. A Cautionary Note

Before discussing the R&D issues, the R&D panel wishes to make some observations about Joint Programs in general. The idea of developing and procuring weapon systems and equipment that serve more than a single military Service has strong appeal. Clearly, research and development money can be saved, economies of scale can be realized, and, the spare parts, maintenance and training activities that are needed for support can be provided more efficiently and economically.

Joint R&D and production programs are one way of obtaining these advantages. However, they are not the only way, and are often a very difficult way. Differences in Service missions, operating environment, technical expertise and sense of priority all make agreements on requirements and management of Joint Programs very difficult to achieve. This panel believes that agreement on these issues is necessary to gain the advantages cited above, and if agreement cannot be obtained, the expected benefits of jointness will not be realized.

The burden that "jointness" places on a program includes: cascading of requirements, merging of dissimilar logistic systems, complication of management, and decreasing flexibility to deal with the impacts on the program of technical and financial problems, or threat changes, during the development and production phases.

Single-Service programs can handle such changes more responsively and more efficiently to meet their single-Service needs. As long as the critically-important abilities to interoperate and intercommunicate are preserved, the operational and fiscal costs of dissimilar Service systems may not exceed the operational and fiscal costs of trying to combine requirements that apply in differing environments, with differing mission contexts and differing support systems.

Those programs where this is not the case are proper candidates for Joint Programs, and for those programs the special management provisions herein should apply.

II - R&D Issues

A. Joint Service Technology Base Issue

The first R&D panel issue addresses whether the technology base can be made more efficient and effective with increased joint Service activity.

1. Background

Many Service and DARPA/Service 6.2 and 6.3A programs now are joint, or coordinated in a joint way. Although we did not attempt to probe this area in-depth, our impression is that, in essentially all areas of mutual interest, the programs are coordinated and a fair number are joint—with one Service as executive agent and the other cost sharing the effort, or with the two Services working complementary parts of a technology area.

Occasionally, one Service will drop its funding contribution due to shifting priorities or to accommodate overall Service RDT&E budget cuts. We find that these perturbations are understood by the other Service and programs are adapted to such changes in a reasonably acceptable way.

The office of the Deputy Under Secretary of Defense, Research and Engineering/Research and Advanced Technology (OUSDR&E/R&AT) provides oversight of the Services' 6.2/6.3A programs.

A formal Joint Logistics Commanders (JLC) technology base coordination mechanism exists (via the Joint directors of labs at the Service 2-star level) which creates, organizes and monitors these Joint-Service efforts. The mechanism appears to be working well.

Such OSD oversight and JLC coordination is important to:

- Ensure competition of ideas,
- Require information exchange,
- Identify areas for coordinated efforts, and
- Provide decision mechanisms for major capital investments.

In a number of areas we find that the documents describing technology progress in various areas are not available on a timely basis to other workers in the field, which promotes technology base waste and inefficiency. This is true between the Services, between DARPA and the Services, and especially so with industry.

2. Conclusions

We conclude that technology base progress and efficiency are reasonably good, that problems created by one Service reducing its technology base funding are manageable, and that improvement is needed in technical information dissemination.

3. Recommendation

We recommend:

- o Keeping up the good work in general, but that the OUSDRE/R&AT should take actions to improve and speed up technical information dissemination between the Services, between DARPA and the Services, and especially between DoD and industry.

B. Technology Push Issue

The second issue deals with "technology push" programs and what can be done to make them more productive.

1. Background

The Services are organized to carry out their operational military assignments and to acquire needed systems. They are not as well organized or funded to create and assimilate wholly new capabilities -especially those that require the combination of "things" - such as sensors, platforms, weapons and C^3. Various studies of innovation -- such as "project hindsight" -- say that most new developments are the result of the synergistic effects of combining many individual technological advances, rather than from any one single major new technological breakthrough.

Many ideas for such new "systems" (even though "seed" ideas may have originated from within the Services) have been advocated by the Service technical advisory committees (the Army Science Board, the Navy Research Advisory Committee, and the Air Force Science Advisory Board), the DSB, and DARPA. This is especially true for "systems" that involve joint-Service actions.

"Project hindsight" also concluded that most technological advances resulted from experiments conducted with real hardware and software, rather than from purely analytical research.

DARPA has undertaken the role of developing and trying out so called "leading edge" ideas to determine if they have significant military worth. Their "technology demonstrations" normally relate to a single-Service, but sometimes involve two or more. The "demos" are sometimes quite large and costly -- greater than $100 million, and involve, by design, high risk. Naturally, some technical failures should be expected.

The Services recognize the need to try out new "leading edge" ideas even where no formal "requirement" for such a device or capability exists. After all, there was no "requirement" for an atomic bomb. However, Service acceptance of such high-risk, externally-generated ideas is difficult, especially when they appear to conflict with established doctrine, compete with ongoing Service programs, or apply in areas where no doctrine exists. This is further complicated if the implied follow-on to the DARPA program involves more than one Service.

So, if the idea seems reasonable to the Service and doesn't "do-in" its own programs, the Service will support - or at least tolerate - the DARPA "technology demonstrations." This is true even when they have not had an opportunity to analyze how and in what form the new device or system would fit into and impact its operations and force structure.

If, however, the new device or system is then imposed upon a Service (or Services) without an opportunity to carry out such an analysis, there is understandable resistance. The probability of eventual deployment of the directed system or device is low, and often for good reason.

Unlike the atomic explosion at Alamagordo, one-shot (limited scope) "demonstrations" are normally not convincing, and further iterations are required to convert the basic idea into the genesis of a new military capability. For example, it took several years of testing and "learning-by-doing" with SOTAS prototypes for the operational and technical branches of the Army to evolve the battlefield airborne moving target radar requirement.

2. Conclusion

We conclude that "technology push" is a vital part of the R&D process. DARPA provides a mechanism that is needed for testing new, relatively-risky, ideas in a flexible and relatively-unfettered mode. The DARPA "technology demonstrations" provide this mechanism and are an important aspect of our overall R&D capability and should continue. We believe that, in most cases, a series of evolutionary "learn-by-doing" demos, with stronger user involvement, will be required to provide a fair and convincing measure of military worth.

Although much informal discussion occurs between DARPA and each involved Service before initiation of these "demos," in the case of the large ($100M) demos, we believe that prior to starting a "big ticket" demo, each involved Service should make an analysis of the potential military value of the "new system." The form of this "so-what test" could vary, but perhaps an approach derived from the DARCOM-TRADOC letter of agreement, or the AFSC "VANGUARD" method could be used. This analysis should be accomplished in a few months, and should assume the system works as advertised. It should not be considered any form of commitment by the Service(s) to the new system. Such commitment can only come about after the formal requirements process has been accomplished. This formal process, which itself is an iterative one, can best be done in parallel with the iterative, evolutionary "learn-by-doing" testing suggested earlier. In this way, adjustments can be made to account for the actual military capability, or lack thereof, found and evolved during the "demonstrations."

The Service may conclude that the capability is not of sufficient value to warrant full-scale development. If OSD disagrees, the matter can be decided by the Secretary of Defense in an environment where all parties have examined the issues and presented their views.

3. Recommendations

Our recommendations are:

- o That DARPA continue a vigorous program of technology demonstrations but plan for iteration and evolution of the idea with stronger user participation.
- o Next, a military impact analysis by the involved Service(s) should be required before initiation of large technology demonstrations. The results of this analysis should be one of the factors considered in determining whether the "demo" should take place.
- o Next, the involved Service should carry out the formal requirements analysis in parallel and interactively with the evolutionary "demonstrations."
- o And finally, the decision to go into full-scale engineering development should be based upon the results of "demos" and the formal requirements and management process.

C. Less Than System Level Jointness Issue

The third R&D panel issue addresses Joint Acquisition at the "less-than-system" level.

1. Background

Joint Acquisition below the system level is another approach which, as noted earlier in this report, has produced economies and efficiencies. These Joint Acquisitions occur at the component level, such as FLIR common modules; at the equipment level, such as TACAN transceivers, and at the major subsystem level, such as aircraft engines.

Joint Acquisition at these levels has occurred rather broadly and successfully. But, the selection process is ad hoc, so some important opportunities may be missed.

As a cautionary note, it was observed that wide use of a common subsystem, such as common FLIR sensors, could bring with it common vulnerabilities. Several solutions to a particular problem complicate the enemy's counter-measures problem.

2. Conclusions and Recommendations

We conclude that Joint Acquisitions below the system level make significant contributions in economies, efficiencies and interoperability. It is likely there are additional opportunities that should be pursued.

A better mechanism is needed: (1) to ensure methodical review and selection of candidate subsystems, equipments, and components; (2) to determine where Joint Acquisition would be appropriate; (3) to assign the program to an executive Service; and (4) to assure adequate support.

The Joint Logistics Commanders (JLC's) are organizationally best situated to do this and have the requisite authority to make and enforce decisions. We

conclude that the Joint Logistic Commanders should establish a formal mechanism for doing this, and so recommend. OSD review and "assistance" should help make this mechanism work.

Oversight would be provided by an annual report to USDR&E. A suitable report also could be provided to the Congress.

D. Funding Issue

The R&D panel's last issue addresses the funding of joint programs.

1. Background

We find that joint R&D programs are funded in a variety of ways, all of which work reasonably well when each Service stays with the original plan and funds its share of any overruns. The problem comes about when changing priorities, or overall budget reductions causes one Service to decrease its support. We learned that this happens frequently. Occasionally, a Service will pull out of a program altogether. As noted earlier, such funding perturbations on 6.2 and 6.3A programs are "managed around" and are not considered a serious problem.

When one Service reduces its funding on a joint program, or is unwilling to fund its share of an overrun, major problems accrue to the joint program. Unfortunately, this happens frequently as the Services adjust their budgets in reaction to new priorities, overruns, and budget cuts imposed by higher authority. We determined that this issue largely disappears for single-Service funded joint programs.

Thus, unilateral funding reductions cause arguing, moaning and program perturbations, but "all hell' breaks loose when one Service pulls out altogether! Withdrawal--such as the Navy's from the F100/F401 Joint Aircraft Engine Development Program--can lead to a fiscal disaster for the remaining partner. The reverberations over the Navy's decision are still echoing around the Air force a decade after the fact.

The GAO, among others, has suggested that a Service be "penalized" for not going joint and/or for withdrawing from a joint program. Some have advocated prohibiting a Service from embarking upon a competing development when it did not wish to join a joint program.

One control mechanism proposed would take the funds which the withdrawing Service budgeted, and transfer them--less those associated with its Service-unique needs--to the remaining partner.

As covered in more detail by the production panel, joint production funding is also done in a variety of ways. Here again, difficulties are caused when one Service reduces or stretches out its original-planned buy to accommodate other needs for funds. Such perturbations, although

sometimes painful, are usually worked out between the participating Services so that a reasonably satisfactory solution is obtained.

2. Conclusions and Recommendations

Our conclusions and recommendations are shown here:

First, all joint full-scale engineering development programs, and most 6.3B advanced development programs, should be single-Service funded. The executive Service would then have in its budget all the funds needed to carry out the program, except for other Service-peculiar items.

Second, the executive Service would be the one with the greatest need and priority, and thus the one least likely to deviate from the plan. If the executive Service's priorities greatly lessen, consideration should be given to changing the executive Service (or Agency) to that with the higher priority, as was recently done on JVX.

Third, if one partner withdraws from a cost-shared program, its current year, budget year, and authorization year funds should reallocated to the remaining partner's budget.

Fourth, for multi-agency programs such as DoD-NASA and DoD-FAA, the DoD should try to arrange for single-agency funding of new programs and budget reallocation of ongoing joint programs where one partner withdraws.

Finally, for joint U.S./foreign programs, we recommend that DoD should try to arrange for single country funding--using the AMRAAM/ASRAAM approach. In this case, it was agreed that the U.S. would fund the development of the advanced medium-range air-to-air missile, AMRAAM, and the European combine would fund the development of the advanced short-range air-to-air missile, ASRAAM.

E. Summary of Resources

In closing, the R&D panel believes that no additional DoD resources would be required to implement our recommendations. The overall result should be eventual greater efficiencies and economies.

The most significant impact will be new short-term demands on the time of senior military personnel, caused by the new joint requirements and management process. The payoff, we believe, will be significantly less time wasted by these same officials (and many others), trying to salvage something useful from the wreckage of a big investment in an improperly-conceived joint program.

CHAPTER IV - MANAGEMENT, LOGISTICS, PRODUCTION SUB-PANEL REPORT

I - Introduction

This Chapter addresses three issues that impact on the production of joint programs. First, Joint Program Office (JPO) operations have a major influence on the effectiveness of joint programs. Secondly, we address the joint program impact on integrated logistics support. Lastly, we address the production implications of joint programs. The basic premise of the following discussion is that common program requirements have been agreed to by the Joint Requirements and Management Board or the JCS. We are seeking additional efficiencies in the management of joint programs.

II - Major Issues

A. Role of the Joint Program Office

The role of the JPO becomes a critical day-to-day management vehicle for achieving successful implementation. A quotation from the Foreward of the June 1982 "Joint Logistics Commanders' Guide for the Management of Joint Service Programs" provides an appropriate introduction to the subject.

"Joint Service Program Management offers an exceptional challenge to the Acquisition Manager. Effective joint management not only requires a comprehensive understanding of the needs and requirements of each of the Services involved, but also requires an understanding of the differences in areas such as logistic support, financial management, program management philosophy, organization and test and evaluation techniques...."

Many people stated that problems exist in the JPO function, particularly in matters of personnel and working agreements. These problems frequently go beyond the Executive Service responsible for the JPO.

- Selection, staffing, performance reviews, and career growth implications of personnel in the JPO - particularly those from other than the Executive Services - are sources of unnecessary problems.
- Failure to have clear, comprehensive roles/responsibilities/procedures, agreed to among the participants, impacts the effectiveness of the office and contributes to frustration.

Oversight committees, at times, are seen as helpful by the JPOs. This may be due to the fact that Joint Requirements and Management (JRM) process had not taken place. However they can impact executive service control or create organizational confusion such as currently exists in the Interdiction Program.

Testimony has been received that, unlike other services, assignment to JPO duty by Navy personnel is viewed as limiting to career growth.

Input was also received from a variety of sources as to the importance and difficulty of the project office management.

Below is a partial sampling of input:

1. R.G. Freeman, III's memo to Admiral Kidd (Ret.) dated July 1, 1983.

"PEOPLE: Every example I have cited dealt with people. Good people make joint programs work. Parochial, service-oriented people would not. It is obvious you cannot remove all parochialism on the part of joint project managers, but let me set out some criteria to be used. FIRST, project managers should have had a tour in an operational component of the other Services or at the minimum a staff position. SECOND, he or she should have attended an inter-Service college, such as ICAF, or the other Service's War College. THIRD, most desirably he or she should have been in a joint program as a junior player. FOURTH, they should have attended the long course in Project Management at the DSMC and, prior to becoming the Project Manager, should have attended the Executive Management Refresher Course. The same criteria flows for the industry team as regards related experience with both services in systems development. The civilians and down through Lt. Col. and Commander should attend DSMC's long and short courses and should have had joint Program Manager experience. These are tough criteria to meet, but I can think of no place that we can do more cost avoidance on the life-cycle cost of a major joint system regardless of the phase of acquisition, than by the selection of extremely qualified people who are going to manage a joint program. This helps insure the objectivity and dedication to make it work. The critical elements in my opinion in dealing with joint programs are first the people who manage them."

2. Views of an industry expert with significant experience on joint programs Officers fitness reports depend on satisfying their Service.

- Personnel are rotated too frequently (as soon as they learn the job).
- Organization lines and authority may not be as crisp as on a single-Service project.
- Assign a very strong dedicated project manager capable of dealing with Services, OSD, and Congress.
- Chiefs of each Service involved must commit publicly and privately to support the program and conduct regular joint reviews.

3. RADM W. Bodensteiner and Captain J. T. McHugh's report to the DSB Summer Program Study Group dated June 29, 1983 regarding joint programs:

- Joint programs generally have special management groups
- No single disciplined procedure
- Non standard direction
- Multiple Committees.

4. Combat Identification Systems - Under lessons learned

- Early HQ level Agreement
- Role & responsibilities of participants
- Program Office Charter and Manning

5. Joint Guayule Rubber Program - Personnel lessons learned

- Status/Recognition accorded to joint assignments need to be improved.
- Filling of joint vacancies should be prioritized by need.
- Program Manager needs to have greater impact on final selection of personnel.
- Fact should be emphasized that OERs/fitness reports of joint program personnel are given equitable treatment.

6. HARM - (Missile)

- No clear cut lines of authority
- Changing requirements
- Give executive service real influence over personnel
- Conflict resolution

7. GPS - Lessons learned

- Program authority and management single program director -in performance evaluation chain for everyone in the JPO.
- Component Deputy Program Managers should be dual hatted and should be assigned as line chiefs.

Other references to the JPO function were found in AMRAAM, A-7, JTF, JTIDS, MILSTAR, and WIS project input.

There is general agreement that a majority of the problems confronting JPOs should be addressed by the proposed JRMB (Joint Requirements and Management Board) or the JCS. Joint Programs tend to be more complex than single-Service programs and require extraordinary management skills and comprehensive memoranda of understanding (MOUs) on how they are to be run. The importance of the JPO function should not be taken for granted or be underestimated. The chain of command within the Executive Service must be clear and acknowledged by all. The Executive Service must take ownership for and be committed to the successful completion of the joint program.

B. Recommendations on JPO

The JRMB and the Executive Service should ensure that the staffing and powers granted to the JPO are commensurate with the Joint Program challenges.

We endorse the view of several program managers about the need for and the value of clear, documented, and comprehensive MOUs. Agreed to MOUs that

define role, responsibilities, authority and procedures among the participating Services are vital. Among the items to be explicitly addressed are: the authority of the JPO in selection and staffing of qualified personnel, strengthening the representation of the participating Services by having key personnel function as their Service project office manager, grant greater authority for JPO's role in arbitrating minor changes in funding and budget issues and establishing procedures to ensure a single interface with contractors is observed.

The Joint Logistics Commander's handbook for Joint Program Managers recommends that the program manager write the fitness reports (or officer efficiency reports) for their subordinates, and that the fitness report of the Deputy be reviewed by the parent Service. This practice should be consistently practiced and the report included as relevant in home service career deliberations.

The Navy seems to have a unique problem in that JPO duty appears to inhibit career growth. The Navy should implement appropriate corrective actions to address the problem.

C. Joint Program Impact on Integrated Logistics Support

JRMB should discourage oversight committees unless necessary. Full weight should be given to ensuring the JPO is capable and has the backing, full complement of skills, and other elements required for successful program execution. When one is necessary, its role must be clearly defined.

Turning now to anticipated savings in integrated logistic support, there are legitimate Service differences in operational needs that must be accommodated early in the requirement process. Take, for example, the Blackhawk/Seahawk helicopter program. The Army version must work to altitude in dusty conditions; the Navy version must work at sea-level in salt spray conditions. But, if common equipment specifications that will fulfill all operational requirements can be agreed upon, cost for logistic support should go down.

Case studies provided to the panel support this point:

Case Study on JTIDS (USMC Programs) - "The development of two distinct terminal technologies has complicated the ability of the Services to achieve joint interoperability." This complicates Integrated Logistics Support and production.

Case Study on Joint MILSTAR Program - "Also, Service differences in maintenance philosophies has made the logistics support planning for the Mission Control Element much more complex." In our opinion complexity results in increased costs.

Because of differing Service support philosophies, integrated logistic support elements, such as data, publications, test equipment and training, can diverge in costly ways. There is a trade off to be made whether it is

effective to accommodate non-standard joint logistic support or to convert to Service standards. For example, if a particular jointly procured system could be maintained on Service standard test equipment, then it might not be a saving to buy and use system peculiar test equipment. That this has been a problem was confirmed by an industry spokesman.

"Documentation and Specification requirements are inconsistent and difficult to resolve." Each Service prefers its own:

- Spares are not normally procured jointly.
- Training requirements are different.
- Hardware schedules are not easily coordinated.
- Each Service has its own set of standard hardware.
- Test equipment requirements can be radically different.
- Proposed change by one Service is often not coordinated with other Service.

If the Services order spare parts on different schedules under different contracts and accounting procedures, each order will be smaller and probably will carry a higher per unit price tag. It might even happen, at times, that two Services would be ordering spares simultaneously, essentially competing for the contractor's manufacturing capability, and at other times lack of orders would leave the plant capability idle. A coordinated smoothing of production requirements could lead to cost savings.

> A case study of the F-4 joint program indicated: "Because the aircraft spares/parts are not/nor were they ever mixed, services did not make commonality work." "Probably the most significant factor in the F-4s success was that it was a relatively mature, successful system when the Air Force decided to procure it. Initially, the Air Force obtained 29 Navy aircraft for aircrew and maintenance training (thru a Navy/AF MOD Feb 1962) which they later returned to the Navy."

During Service introduction, any program has difficulty because of lack of trained personnel and usage data for spares. These problems are magnified in joint programs. For example, operational testing and first-site build-up of joint programs could be happening simultaneously at two or more sites. Interim contractor support can help smooth the introduction by supplementing training and allowing an orderly development of usage data.

Our conclusions generally follow the line that maximum savings are accrued by continuing commonality and identicality in data, publications, test equipment, training, and spares as far as practicable. This is much easier said than done, however, and each new weapon system or vehicle must be evaluated carefully on a case-by-case basis. The decision of how far is "practicable" must not be made on the basis of the philosophy that jointness is good, but on the basis of hard cash savings in one way or another. In saying this we are mindful that the savings are real only if the essential requirements for each Service are, in fact, satisfied.

D. Recommendations on Logistics Commonality

We recommend that:

- JCS or SecDef task JRMB to establish policy for training and logistic commonality. This front-end determination is important to set the framework for the amount of jointness which will be achieved by the program.

- Executive Service Joint Logistics Command member request JLC to adjudicate Service logistic differences to extent authorities permit. The organization of the JLCs provides a working level forum to resolve logistic issues that can't be handled by the JPO or the Executive Service.

- Using Services request Executive Services to contract for spares and interim contractor support when appropriate. This should minimize the actual dollar cost of spares and keep the talents of the contractor behind the program until transition is complete.

E. Production Implications of Joint Programs

A basic premise for production economies is a consistent volume over a long period of time. The contractor and the government both gain the benefit of learning. Depending on the commodity, learning curves generally fall in the 75% to 90% range. This means that the contractor can reduce the manhours by about 10.0% - learning curve percent each time he doubles the production quantity. This clearly leads to significant savings.

With the planning, programing, and budgeting system of the DoD, each program is reviewed annually as a part of the process to allocate dollars for the next year. Therefore, the budget process automatically assigns priorities to each project.

A joint program is normally funded for production by the parent Service and is therefore subject to shifting priorities. When the member Service priorities change from what they were originally, the joint program starts to suffer. This is not significant unless, as is sometimes the case, one Service program's priority puts the project in that Service "below the cut line" category for gaining funding.

Changes in the production line have an effect on unit price. If the quantity goes up for a certain period, then the price comes down due to faster learning, and sometimes economies of scale in the purchase of material or vendor's production line economies. Significant reductions in planned production usually increase unit costs beyond the capability of the remaining Service to still be able to buy the quantity desired with the money that they had planned on being available.

A production line is partly governed by the specifications and standards imposed by the customer. In a joint program, if the producer must implement both Services' standards, it requires him to spend additional money. This cost is passed along to the joint program office as an allowable cost. During a briefing by the joint project manager of the high speed anti-radiation missile the following chart was show:

"Interchangeable missiles are of one common configuration:

- o Saved $700M on a $6.3B program.
- o Support equipment is common.
- o Joint Service software lab established."

A Service joining up with another Service already in production will save development costs and both Services will gain production savings.

A single-Service program manager is doing his best to bring in his program for the lowest price and optimally designed for that Service. Therefore, unless he has been given a set of requirements from another Service that he must stay compatible with (not often done unless there is a plan to go joint later, or he is recognized as already joint), design changes may be permitted by him that will prevent another Service joining later. The panel recommends that in high cost systems it may be desirable for a non-participating Service to monitor the program so that it may be considered for a fallback position later.

The DoD planning, programing, and budgeting system (PPBS) starts with Program Objective Memorandum development about 23 months prior to the budget money being available to spend. During this phase, the process may show some forthcoming priority problems for a joint program. The President's Budget is actually submitted to the Congress nine months prior to the money being available. If production has been started, there does not seem to be a significant impact of individual Service changes since the budget process allows sufficient time for production planning to be adjusted.

The efficiency of production is maximized (and turbulence is minimized) by minimum changes in the production plan, identical parts or components, and minimum engineering changes. One industry spokesman said: "Hardware commonality leads to economy in procurement - technical -synergism - better use of funds. Large quantity buys reduce unit cost-related to some fundamental procurement policies of DoD/US Government, i.e., multiyear procurement."

Single procedures for all operations affecting the production will save money. This includes using only one Service's procedures for change control, quality inspections, and acceptance specifications.

Production rates that fully use the available tooling also save money. A length of time is required in production to make full and efficient use of sophisticated tooling. The tooling is expensive and must be amortized over a

period of time. Such tooling is supported by the various manufacturing technology programs of the Services. To regain the cost efficiently, it is important the tooling be used at its fullest capacity.

A monitor working on major programs, in which his Service has no immediate interest, could alert his own Service to possible design changes that may affect the suitability for future use.

It seems clear (and of course is intuitive) that a joint production line already open is cheaper--providing the item meets the requirement.

F. Recommendations on Production

We recommend that:

After a joint program has been approved, if the PPBS process creates turbulence, the issue should be referred to the JRMB.

During the front-end process the JRMB should give serious consideration to using some item currently in production that could satisfy the need.

When reviewing a program for jointness, and particularly when joining is not recommended, the JRMB should make a recommendation concerning the monitoring of the developing Service's work.

A joint program should have a single quality assurance program, change control program, and acceptance test program with common documentation to contribute to a smooth production flow. Additionally, the numerous generic and technical specifications imposed to the contractor should have duplication removed. This will take a strong effort on the part of the joint program manager and the involved Services to select the specifications that meet both Service's requirements. While this is hard to accomplish (the H-60 management team indicated that it has been two years for them to agree on a joint corrosion control specification), it is estimated that savings would be in the range of 6-9%.

In addition to the usual precautions, it is becoming more common for the program manager to "restrict" visitors to his contractor as one means of controlling improperly authorized (constructive) changes. The panel endorses this practice.

A P P E N D I X

THE UNDER SECRETARY OF DEFENSE

WASHINGTON D C 20301

RESEARCH AND
ENGINEERING

18 MAY 1983

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Defense Science Board Summer Study: Management of Joint-Service Acquisition Programs

You are requested to undertake a Summer Study to determine what needs to be done to achieve successful joint-Service acquisition programs.

There is a tendency toward increasing the number of joint acquisition programs. There are a number of reasons for this including growing requirements for increased joint-Service warfighting and the need to preclude redundant acquisition efforts among the Services. Although joint programs are intended to rationalize requirements, experience has shown, however, that many have been extremely difficult to manage, and, for a variety of reasons, have not been successful. Nonetheless, it is anticipated that the need for joint-Service acquisition programs will continue.

This Summer Study should examine joint acquisition programs and make recommendations on how the OSD, JCS, and the Services might formulate and execute them more effectively. The study scope should include, but not be limited to, the following:

1. Examining past and present joint programs (successes as well as failures), and ascertaining why the examined programs succeeded or failed. What factors uniquely contributed to joint program success and problems?

2. Recommending changes, if necessary, in our procedures to increase the motivation for Service support of joint programs. What incentive, management and other changes would improve the effectiveness of executing joint acquisition programs?

I am sponsoring this Summer Study. Admiral Isaac C. Kidd, Jr., USN (Ret.) has agreed to serve as Chairman, and Mr. John Smith, OUSDRE/AM, will be the Executive Secretary. Dr. Ralph E. Chatham, LCDR, USN, will be the DSB Secretariat representative. It is not anticipated that your inquiry will need to go into any "particular matters" within the meaning of Section 208 of Title 18, United States Code.